Sydney PC User Group
Smartphones SIG
Mtg 2 – Intro (cont.)

John Shiel

Mobile Phones with fast connection, easy text entry

Agenda

- *Technologies that have converged to create the smartphone platform in the last 5 years*
  - *Usability*
  - *Basic components*
    - *Comms speed increase (now 3.5g),*
    - *Smaller and faster processors &*
    - *Flash storage, and "grid"*
  - *Compression formats – see applications*
- *6:50pm Coffee break*
- *Adv mobile applications & converging technologies*
  - *Mapping (& finding local services e.g. restaurants and service stations)*
  - *Video*
  - *Photo*
  - *Radio*
  - *Music*
  - *Monitoring resource usage (to extend battery life)*
  - *Member phones*

2

Last Month

- *My wish list…*
- *Mobile phones power – processor and comms*
- *Other Features*
  - ***Usability***
  - ***Advanced storage***
  - ***Calendar,***
  - ***Office & pdf docs,***
  - ***Browsing,***
  - ***Email,***
- *Features of member phones*

3

Usability

- *Data Output*
  - *Large enough screen (or easy zoom ability)*
  - *Large text*
  - *External screen, amplifier*
- *Data Input*
  - *Simple phone keypad eg. Nokias*
    - *Large keypad for fingers*
    - *T9 dictionary*
    - *Buttons for popular applications (80/20)*
    - *Shortcuts*
  - *Qwerty buttons on face eg. Blackberry*
  - *Slide out Qwerty keypad eg. Nokia N97*
  - *Touchscreens eg. iPhone*
    - *Sensitivity*
    - *Physical keypad as well?*
    - *Multi-touch – nice to have*

4

Usability 2

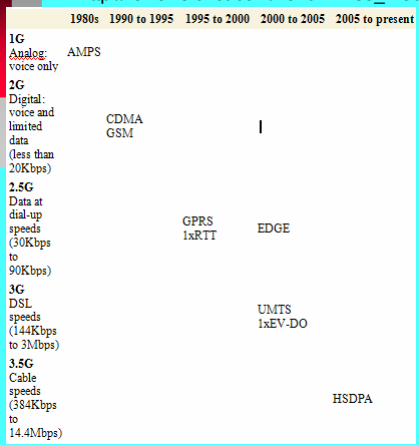
- *Basic Applications*
  - *Office & calculator*
  - *Play Music, Video, Radio*
    - *Buttons for Volume, Play Next track, Pause etc.*
  - *Record Photo, Video, Audio*
    - *Buttons to start, stop etc.*
  - *Maps*
    - *Button to start, easy to save favourites, to retrace steps (for crumbs, just save start and end for "drive to" or "walk to"), zoom in/out*
- *Other Applications*
  - *Track weight loss sensing exericise etc.*
  - *Games – tilt to let ball roll down obstacles*

5

Speed of Communications

Generations - 1G, 2G, 2.5G, 3G, 3.5G

http://reviews.cnet.com/4520-11288_7-5664933-2.html?tag=rb_content;rb_mtx



At least 3g is required to browse web & download emails – Yr 2000

- *1G (AMPS) – analogue – voice only, easily intercepted*
- *2G (GSM, CDMA) – digital – voice & limited data*
  - *Speeds less than 20 Kbps*
- *2.5G (GPRS, 1xRTT - an early version of CDMA2000 - to EDGE) – data at dial-up speeds*
  - *Speeds 30 – 90 Kbps*
- *3G (UMTS, 1xEV-DO) brings wireless broadband data services to your mobile phone*
  - *Speeds 144 Kbps - 2.4 Mbps*
    - *Speed through Web pages, enjoy streaming music video, watch on-demand video programming, download and play 3D games, and videoconference*
- *3.5G (HSDPA)*
  - *Speeds 7.2 Mbps - 14.4 Mbps*

6

Compression formats & easy conversion programs

- *Video – YouTube (flv, mp4)*
  - *Lossy, aggressive compression formats*
  - *Convert to .mov (quicktime)*
    - *Eg. using Format Factory*
  - *Convert for phone screen size and playback format*
    - *Eg. via PC Suite for Nokia*

7

Video Formats

- *H.264/MPEG-4 AVC compression protocols – 100kbps*
  - *Firefox via plug-in*
- *Newer MPEG-4 video and audio compression format can deliver high-quality video at 2 Mbit/s*
  - *ISO/IEC Moving Picture Experts Group (MPEG) (ISO/IEC JTC1/SC29/WG11) under the formal standard ISO/IEC 14496 - Coding of audio-visual objects*
- *VC-1 – proprietary Microsoft format in WMV9, adopted by SMPTE as 421M video codec standard*

8

Memory & Storage Advances

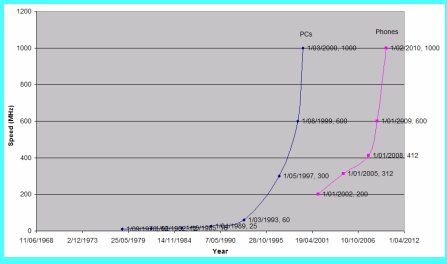
(eg. "tiny" 8GB microSD Flash Memory Cards)

- *Flash memory has advanced quickly for large increases in internal memory and card memory*
- *Provides capability for mobile-phone advances such as*
  - *Colour screens,*
  - *Integrated digital cameras,*
  - *3D games*
  - *Lots of music & video storage*
  - *Can store street maps of the WHOLE WORLD*

9

Smaller and faster processors

(Shiel, 1985 & 2010), (Kee, et al. 2004)



- *Phones have about the same speed as a PC in the year 2000*

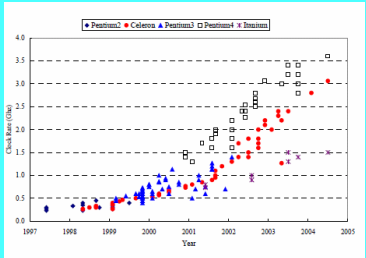


Figure 1. Processor clock speed of Intel processors (Ghz)

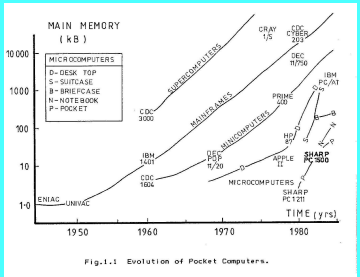


Fig.1.1 Evolution of Pocket Computers.

10

Cuppa

- Back at…

11

Consider Nokia 6710 Nav.

- First and foremost
  - It is a phone !!! Small size, weight
  - Easy to make calls
  - Simple keys
    - Slideout/in to answer/stop calls
      - Configurable
  - Buttons or shortcuts for frequent functions
    - Maps
    - Camera start, Shoot photo/video
    - Volume
    - “Soft” keys
    - 6 User definable shortcuts to anywhere

12

Mapping

& finding local services e.g. restaurants and service stations

GPS – outside, satellites

A-GPS – indoors, includes network cells

Demo

13

Video

- *Can record digital video for length of chip, at lower quality*
  - *Time left to record shown on screen*
  - *Can quickly delete clips*
- *Play back video*
  - *Quickly jump to spot on video of interest*
- *Have most interesting videos with you, and can quickly show point*
- *Demo*

14

Photos

- *Good 5MPx camera*
- *Carl Zeis Lens*
- *Auto focus*
- *LED flash*
- *Jpg format*
- *Good quality prints*
- *Online upload*
- *Geotagging*

- *Demo*

15

FM Radio

- *Finds local stations*
- *Volume button as per music, video*
- *Easy to jump between them*

- *Demo*

16

Downloaded free applications
eg. Monitoring Resource Usage

- Energy Profiler
  - For Developers to check Resource Usage
  - For users to prolong battery life
  - Gives fascinating insight into
    - workings of phone,
    - cellular network, and
    - energy saving mechanisms

17

Profiling Application

- Power – 1W to 4W (av. - brighter colour, max/min in drkr)
  - Length of battery time left
- Current – 200mA to 1000mA
- Processor load % every .25 sec
- RAM memory MB – 2 graphs (used, avail)
  - Corner shows Delta = (Max Used) minus (Min used) over time
- WLAN – WiFi dBm signal strength when connected
- Network Speed – IP packets in kbytes/sec
  - Corner shows total bytes during time (Use "6" for uplink/downlink toggle)
- Signal Levels – 2G & 3G receive/transmit levels in dBm (power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW)) Use "6" for TX/RX toggle, but 2G TX does not work
- 3G Timers – 3G T1 & T2 timers – best networks are 2 secs
- Energy – in mAh (default off – go to options)
- Voltage – battery voltage

Keypad Shortcuts
0. switch views
2. start stop msmt
5. Insert marker - (hold down "5")
6. Toggle corner indicator
7. Rotate display
0 - Enter/exit dual view mode
Up/down – zoom out/in
End - profiler to background

18

Power Ratio Signal Levels

dBm (power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW)

dBm level	Power	Details
80 dBm	100 kW	Typical transmission power of FM radio station with 50 km range
33 dBm	2 W	Maximum output from a UMTS/**3G mobile phone (Power class 1 mobiles)** Maximum output from a GSM850/900 mobile phone
30 dBm	1 W = 1000 mW	Typical RF leakage from a **microwave oven** Maximum output power for DCS 1800 MHz mobile phone Maximum output from a GSM1800/1900 mobile phone
27 dBm	500 mW	Typical cellular phone transmission power Maximum output from a UMTS/**3G mobile phone (Power class 2 mobiles)**
21 dBm	125 mW	Maximum output from a UMTS/**3G mobile phone (Power class 4 mobiles)**
20 dBm	100 mW	**Bluetooth Class 1 radio, 100 m range** (maximum output power from **unlicensed FM transmitter**) Typical **wireless router transmission** power.
15 dBm	32 mW	Typical **WiFi transmission power in laptops.**
-10 dBm	100 µW	Typical maximum received signal power (-10 to -30 dBm) of **wireless network**
-70 dBm	100 pW	Typical range (-60 to -80 dBm) of **wireless (802.11x) received signal power over a network**
-127.5 dBm	0.178 fW = 178 aW	Typical received signal power from a **GPS satellite** (1 fW = 0.001pW)

19